Brown Marmorated Stink Bug (*Halyomorpha halys*)

Stink Bug Management Workshop

Nov. 21, 2014

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UC Cooperative Extension, Sacramento County

http://cesacramento.ucanr.edu

University of California
Agriculture and Natural Resources

Making a Difference for California

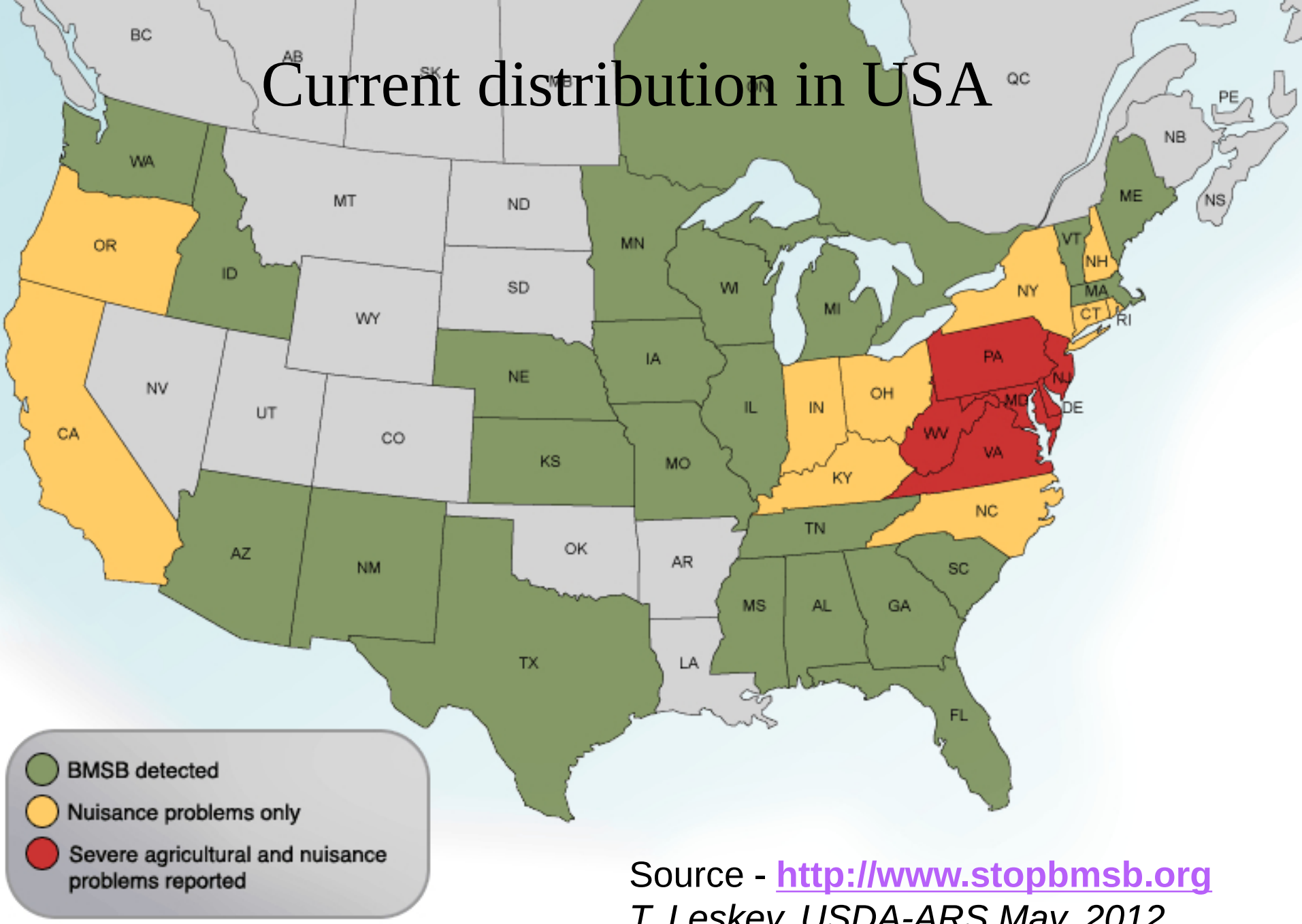
Brown Marmorated Stink Bug
(*Halyomorpha halys*)

Photos: Baldo Villegas

Brown Marmorated Stink Bug (*Halyomorpha halys*)

- Native to East Asia (China, Japan, Korea, Taiwan)
- A crop pest in its native range and here
- ID'd in Allentown, PA 2001
- Household nuisance pest in fall, winter
- Host list currently 170 spp., likely to rise

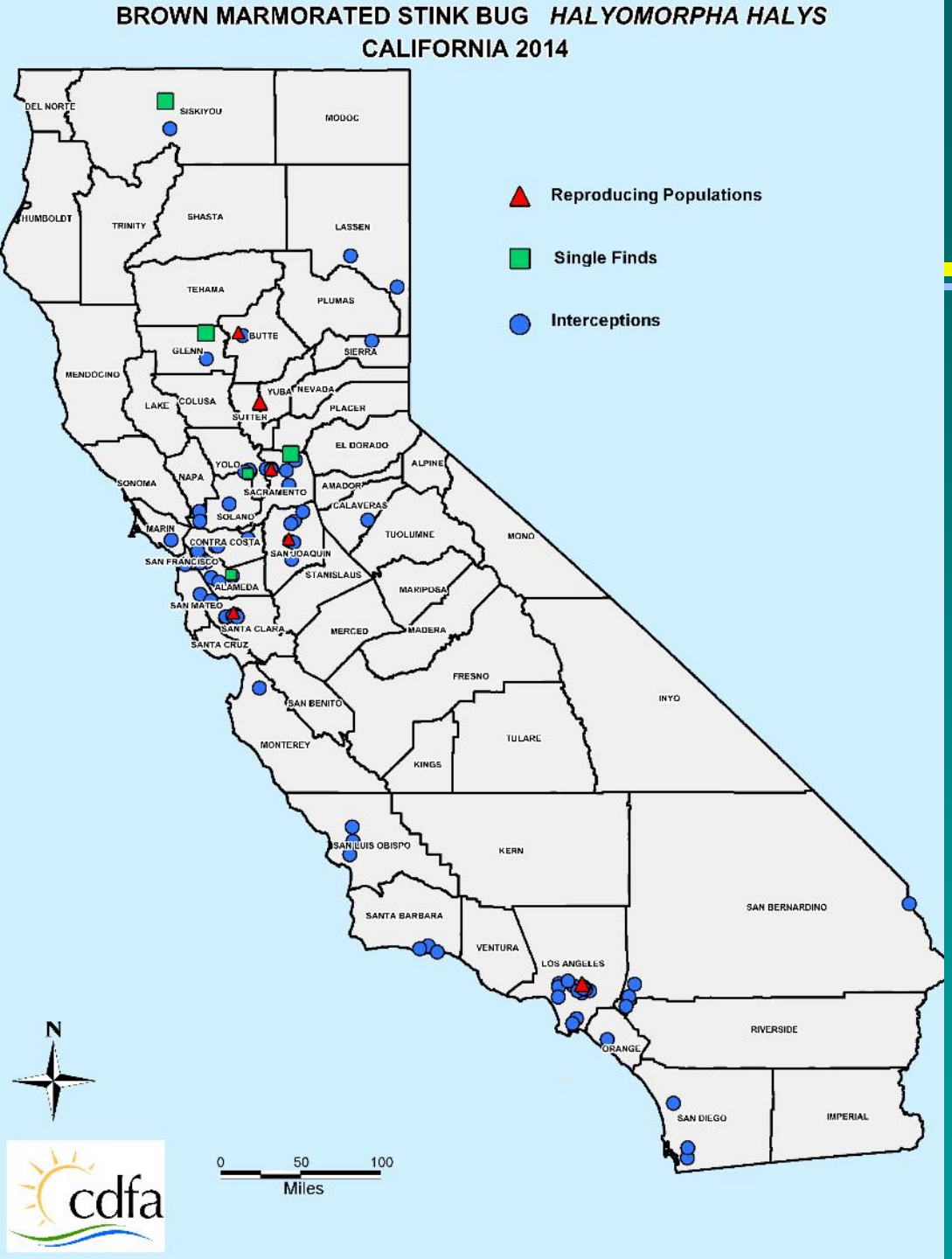
Current distribution in USA



Source - http://www.stopbmsb.org

T. Leskey, USDA-ARS May, 2012

BMSB in Calif.
2014



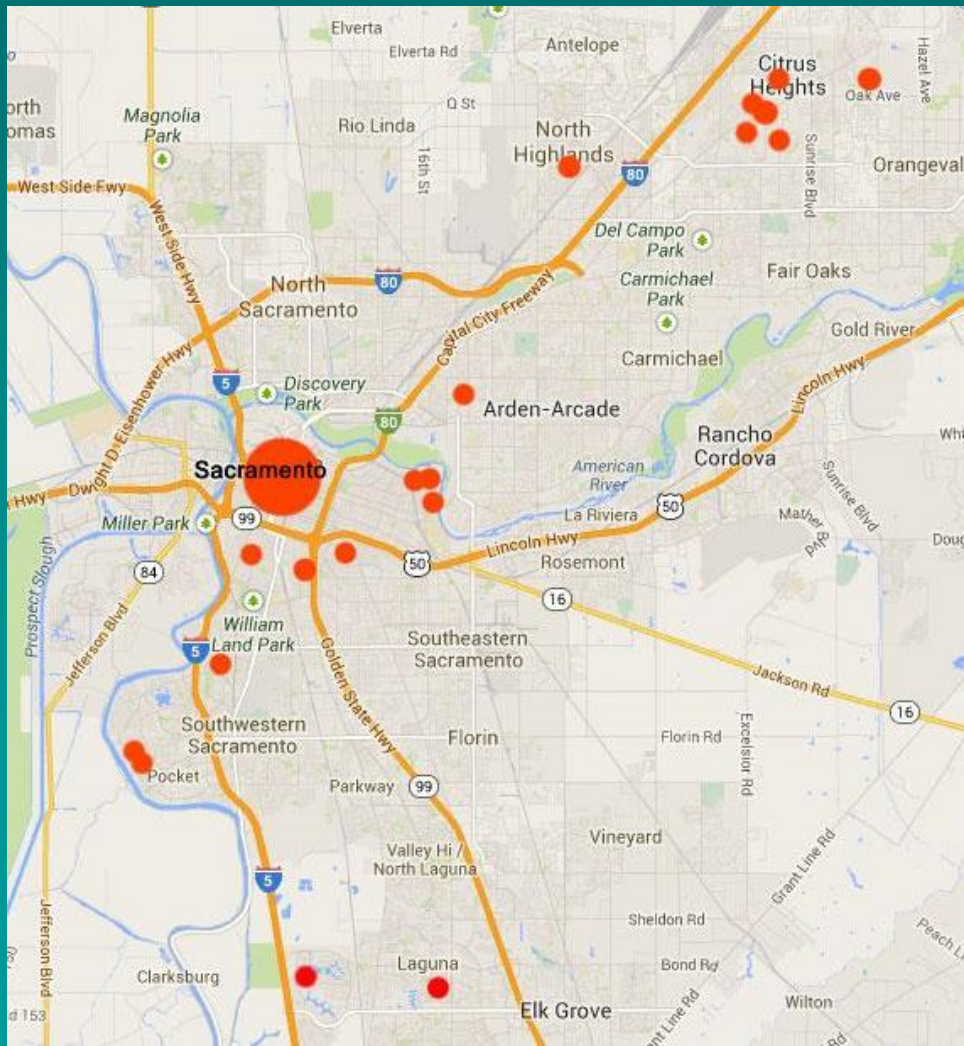
Established populations in:

Butte
Los Angeles
Sacramento
San Joaquin
Santa Clara
Sutter
Yolo (new)

BMSB Finds in Sacramento County

Oct. 15, 2013

Nov. 2014



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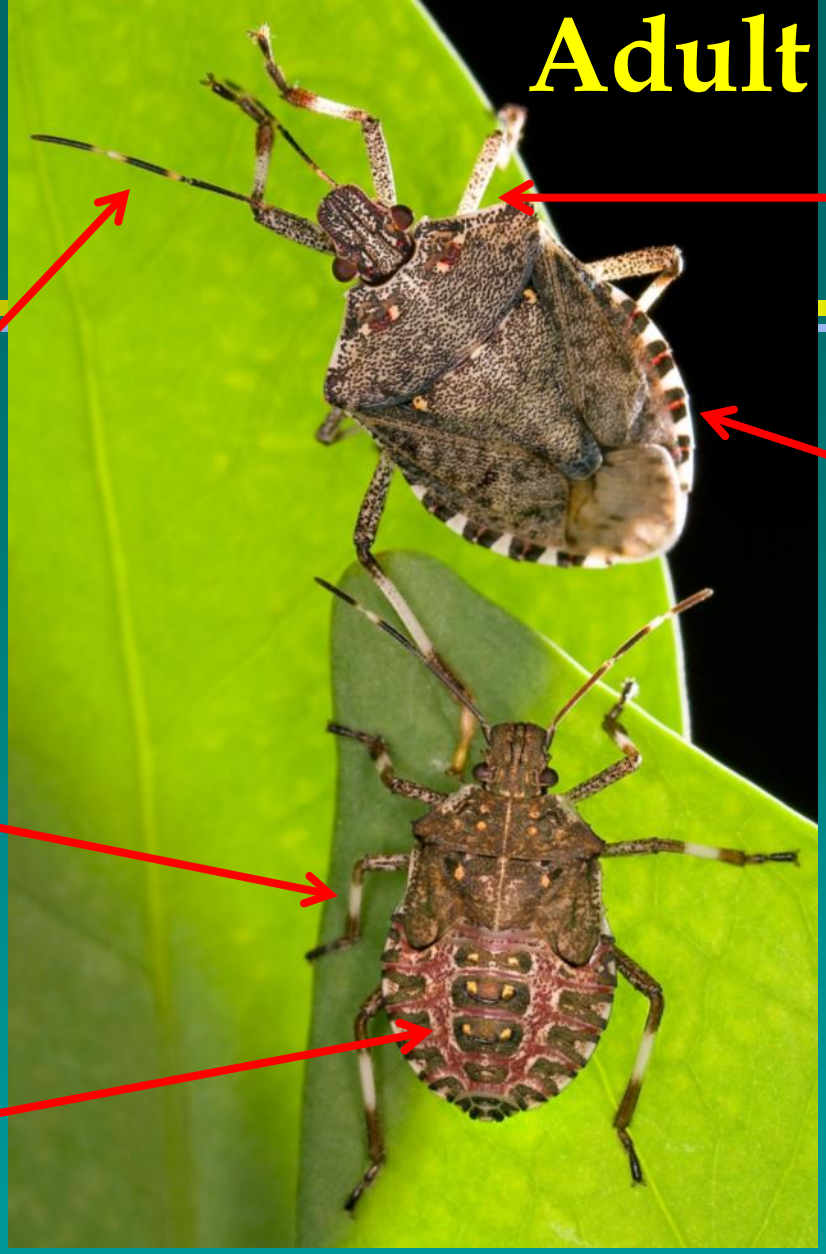
Actual adult size
5/8 inch

Two white bands
on antennae

Banded legs

Rust color with
broad brown
markings



Smooth
“shoulder” edges

Banded
abdominal edge
extending
beyond wings

Mature nymph
(5th instar)

Photo: UC IPM



Eggs (20-30) & nymphs

Nymph (3rd of 5)

Adult

Rough Stink Bug vs. BMSB

Rough stink bug

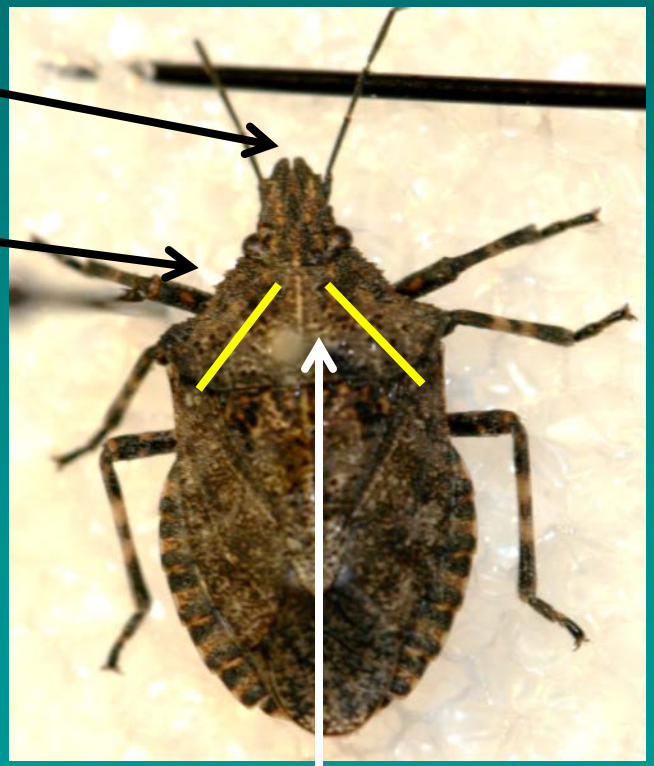
BMSB

Rough Stink Bug vs. BMSB

Rough stink bug

Pointed

Rough



Narrower angle

BMSB

Blunt

Smooth

Wider angle

Consperse Stink Bug vs. BMSB

Consperse stink bug

BMSB

Solid brown

Marble color

1/2 inch

5/8 inch

5 Nymphal Instars Male Female

- Overwinters as adult in sheltered areas
  - Tree crevices and homes, barns, other structures
- Each adult lives 6-8 months
- Female lays about 250 eggs, mates multiple times
  - Each female can lay up to 9 egg clusters
- 1-2 generations in Mid-Atlantic states

Aggregation Season (late summer), Pennsylvania

Photos:
Tracy Leskey

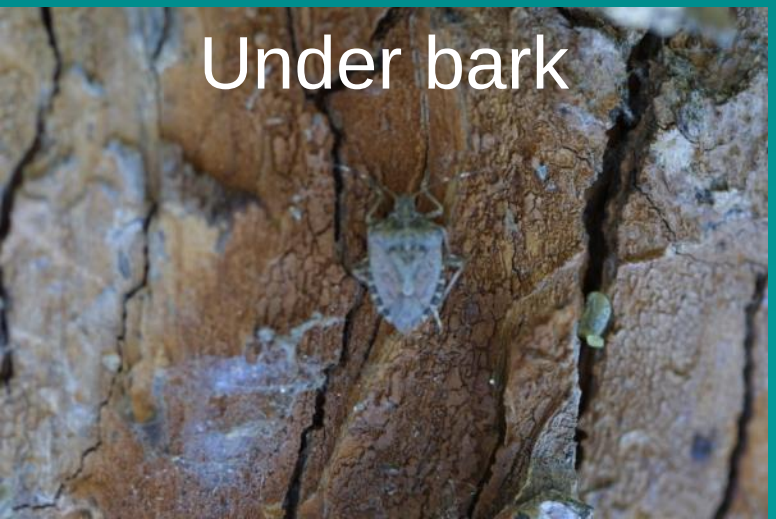
Aggregation Behavior

Photos:
Tracy Leskey

BMSB
An Arboreal Species

Sacramento
March 2014

Downspout



Host Plants

Crops

- Stone fruits (esp. peach), pome fruits
- Berries
- Grapes (not a major host)
- Eggplant, tomato, okra, pepper, corn, beans, sunflower

Host Plants
Selected Ornamentals

- Catalpa
- Chinese pistache
- Elm
- Maple
- Holly
- Princess tree (*Paulownia*)
- Pyracantha
- Redbud
- Rose
- Tree of heaven
- Waxleaf privet

Stink Bug Feeding

BMSB Damage

Sacramento 5/22/2014

BMSB Damage
Sweet Corn a High-Preference Crop

Up to 100% of ears with injury, Beltsville MA 2011

BMSB Traps

Dead-Inn Traps (AgBio, Inc.)

Grower
48” tall, $30

Professional
24” tall, $20

Homeowner
16” tall, $17

Phermone Traps

Rocket Trap (Rescue)

Phermone Traps & Lures

AgBio, Inc.: $4.25
Rescue: $6 (4 wks.), $10 (9 wks.)
Alpha Scents $4.40 (4 wks.)
Trece – Coming soon

Vaportape (kill bugs in trap)

HERCON®
VAPORTAPE™ II
INSECTICIDAL STRIPS
FOR USE AS TOXICANT IN INSECT TRAPS

ACTIVE INGREDIENTS:
2, 2-Dichlorovinyl dimethyl phosphate.....10.00%
Related compounds.....0.75%
OTHER INGREDIENTS.....89.25%
TOTAL.....100.00%

CONTENTS: 50 strips (1" X 4")

MINIMUM NET WEIGHT: 0.21 oz (5.9g)/1-in x 4-in strip or 13.1254 oz(368.75 gm/500 1-in X ½" strips or 2.625 oz (73.75 gm)/100 1-in X ½" strips

KEEP OUT OF REACH OF CHILDREN

CAUTION

READ DIRECTIONS AND PRECAUTIONARY STATEMENTS BEFORE USE

Understanding BMSB Pheromones

Two Main Lure Types

1. Pheromone lures (USDA #10 and #20)
   - » Harlequin bug pheromone – nearly identical
2. "Synergist" = methyl decatrienoate (MDT)

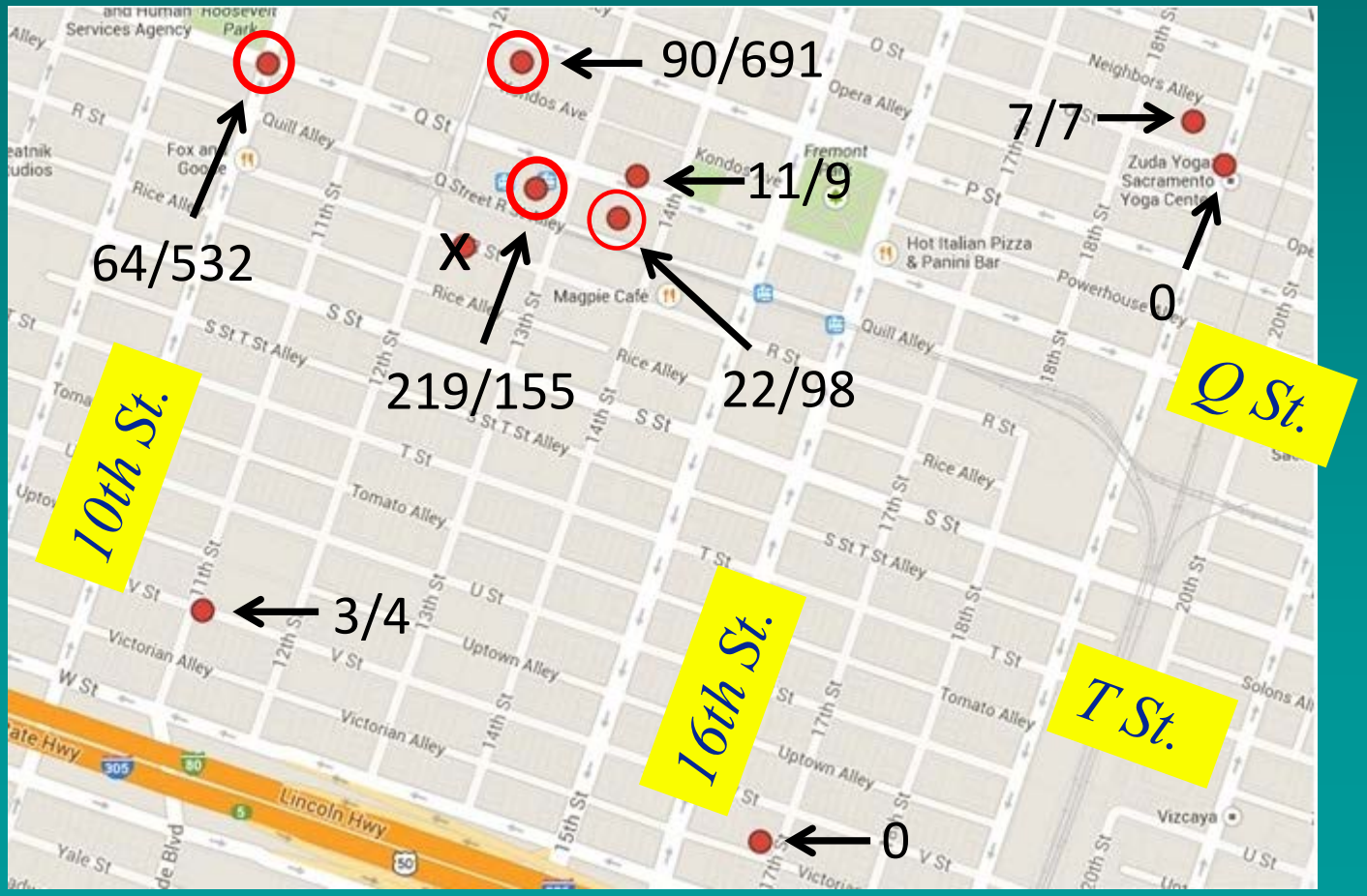
- Best used in combination

2014 Trap Locations & Counts

Midtown Sacramento

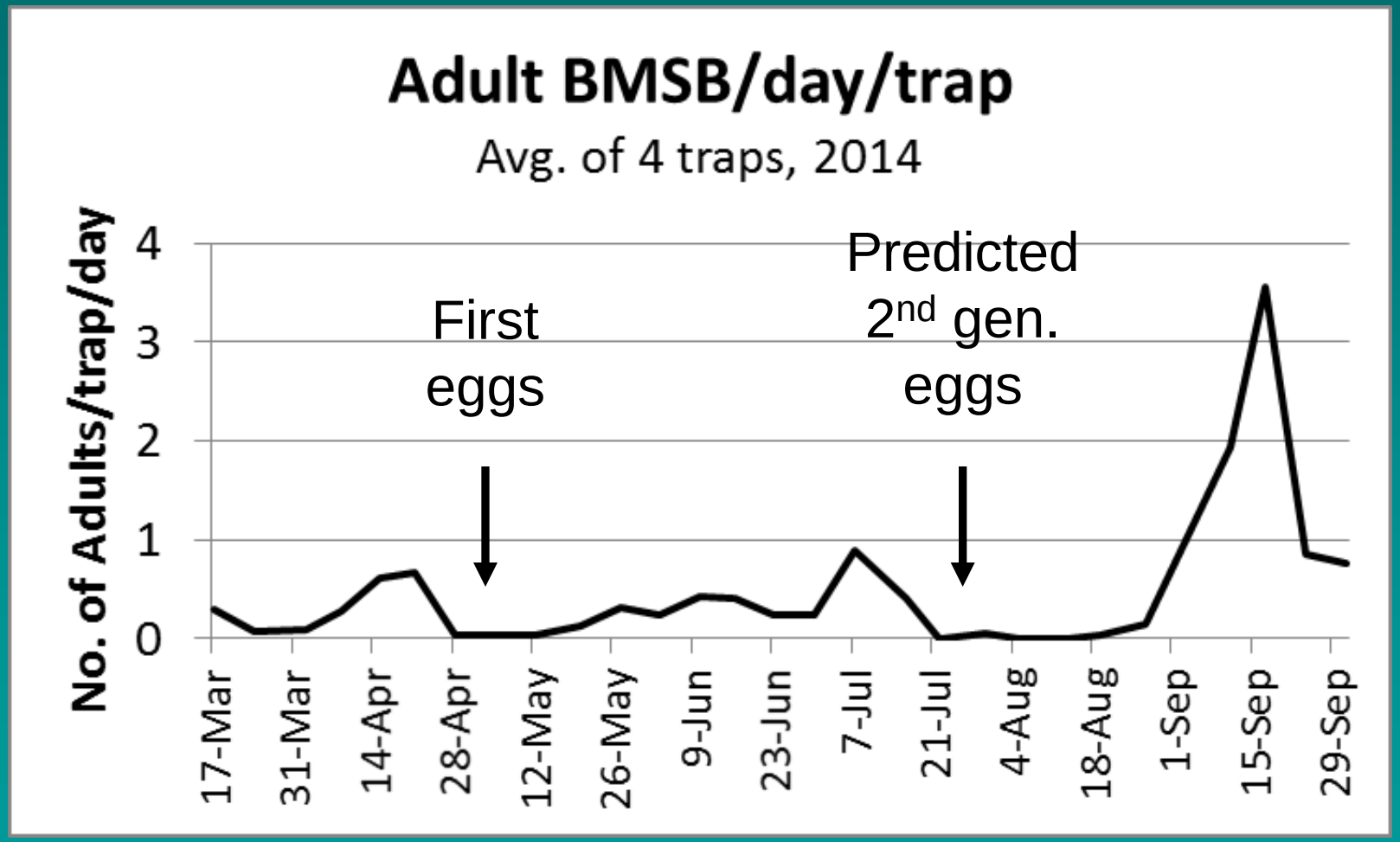
s.

Adults/Nymphs

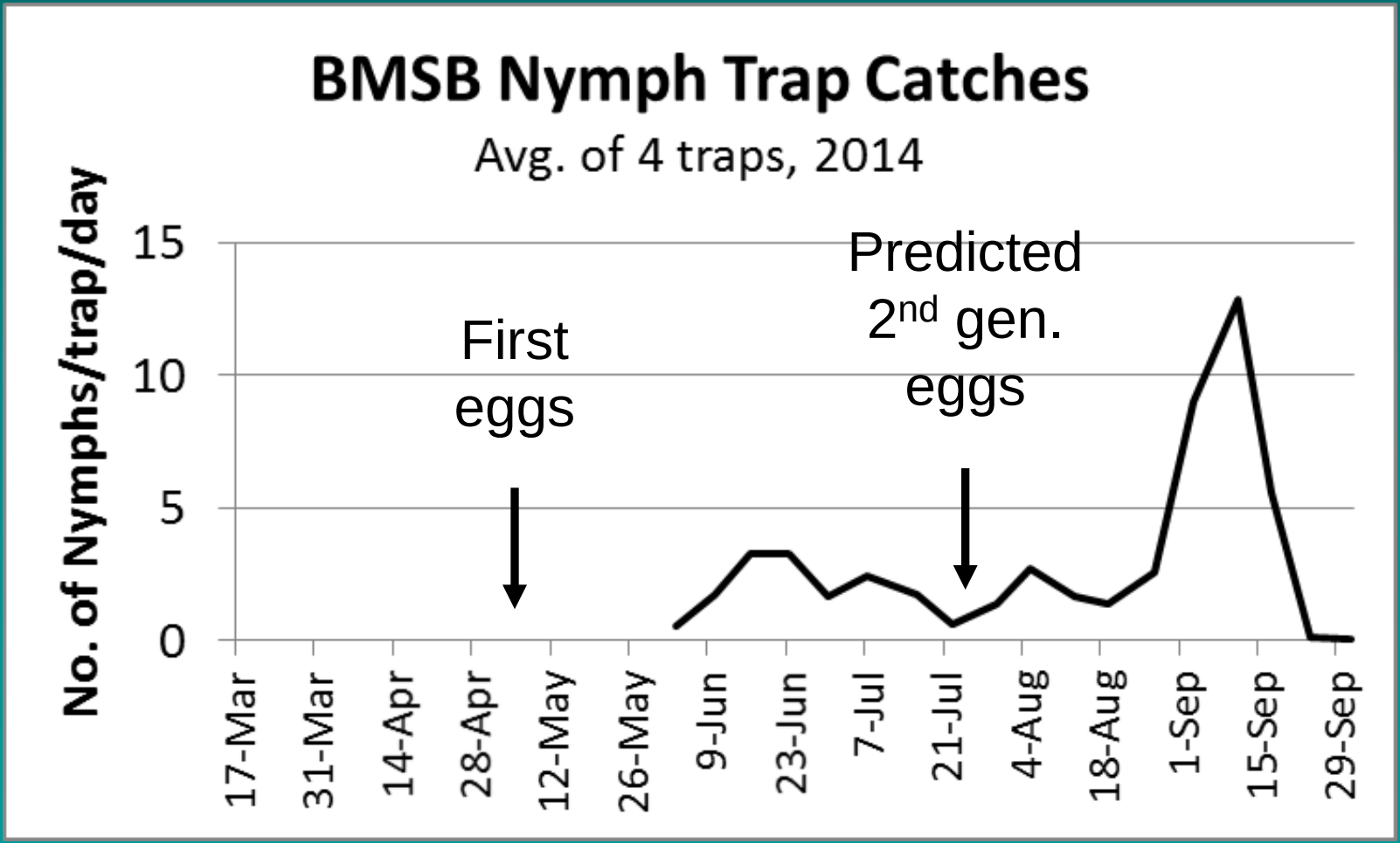


Adults Trapped

Sacramento, 2014



Nymphs Trapped
Sacramento, 2014



Insecticide Bioassay Research

Tracy Leskey et al., 2011

- BMSB "lethality index" (immediate mortality with little or no recovery)
  - » 4.5 hrs. exposure to dry residue, glass containers
  - » Field efficacy may differ

Active Ingredient	Lethality Index	Active Ingredient	Lethality Index
Dimethoate	93.3	Cyfluthrin	49.0
Malathion	92.5	Oxamyl	46.8
Bifenthrin	91.5	Esfenvalerate	43.3
Methidathion	90.4	Imidacloprid	40.0
Endosulfan	90.4	Tolfenpyrad (SC)	36.5
Methomyl	90.1	Tolfenpyrad (EC)	33.3
Chlorpyrifos	89.0	Pyrifluquinazon	28.3
Acephate	87.5	Kaolin Clay	23.1
Fenpropathrin	78.3	Diazinon	20.4
Permethrin	77.1	Phosmet	20.0
Azinphosmethyl	71.3	Acetamiprid	18.8
Dinotefuran	67.3	Thiacloprid	18.3
Kaolin Clay + Thiamethoxam	66.7	Abamectin	16.3
Formetanate HCl	63.5	Indoxacarb	11.3
Gamma-cyhalothrin	59.0	Spirotetramat	9.8
Thiamethoxam	56.3	Carbaryl	9.2
Clothianidin	55.6	Flonicamid	7.7
Beta-cyfluthrin	54.8	Water (Control)	5.8
Lambda-cyhalothrin	52.9	Cyantraniliprole	1.7
Zeta-cypermethrin	52.1		

Tracy Leskey. 2011. The Challenges Posed by the Invasive Brown Marmorated Stink Bug, *Halyomorpha halys* (Stal), to U.S. Agriculture. USDA-ARS Appalachian Fruit Research Station, Kearneysville, WV

Insecticide Bioassay Results – Top 10

Active Ingredient	Trade Name (Example)	Insecticide Class	Lethality Index
Dimethoate	Dimethoate	OP	93.3
Malathion	Malathion	OP	92.5
Bifenthrin	Brigade	Pyrethroid	91.5
Methidathion	Supracide	OP	90.4
Endosulfan	Thiodan	Organochlor.	90.4
Methomyl	Lannate	Carbamate	90.1
Chlorpyrifos	Lorsban	OP	89.0
Acephate	Orthene	OP	87.5
Fenpropathrin	Danitol	Pyrethroid	78.3
Permethrin	Pounce	Pyrethroid	77.1

Insecticide Efficacy
Field Study (Leskey et al., 2013)

- High mortality on day of application: Endosulfan (e.g., Thiodan), methomyl (Lannate), thiamethoxam (Actara), and bifenthrin (e.g., Brigade)
- Fenpropathrin (Danitol) and dinetofuran (Venom, Scorpion): strong anti-feeding effect for 7+ days
- Peaches in Mid-Atlantic: 10-12 weekly applications, alternate-row, late May-harvest using pyrethroids and neonicotinoids
- Effective insecticides in lab: only 60% average mortality in the field when applied late early July, 40% in Aug., and 20% in September

2014 Orchard Spray Recommendations

VA, WV, and MD Coop. Extension

- Products that have shown good effectiveness against BMSB include:
  - » Pyrethroids: Baythroid XL (B-cyfluthrin), Danitol (fenpropathrin), Warrior II (Beta-cyfluthrin), products containing permethrin (e.g. Pounce)
  - » Neonicotinoid: Belay (clothianidin)
  - » Carbamate: Lannate (methomyl)
  - » Premixtures: Endigo ZC (Beta-cyfluthrin + thiamethoxam) and Leverage 360 (imidacloprid + cyfluthrin)

Alternative BMSB Management

Penn. State Univ., Rutgers Univ.

- Border applications
  - Use strong residual products
- Treat surrounding vegetation, if feasible
- Alternative crop plantings
  - Possible trap crops (e.g., beans, Paulownia trees)
  - Spray trap crops

Organically Acceptable Insecticides

Partial to fairly good control of nymphs only:

- Pyrethrum
- Azadirachtin
- Spinosad
- Sabadilla
- Insecticidal soap
- Combinations

Biological Control?

- Foreign exploration done by USDA
- Egg parasitoids - *Trissolcus* spp.
- Possible release in Calif. in 2016

Gymnosoma par

Predators Seen in 2014

Assassin bug

Praying mantis

Spiders

Questions?

Important Web Sites

StopBMSB.org

ucipm.ucdavis.edu

cesacramento.ucanr.edu